ECTIVE GEAR

esearch Finds N95 Masks lay Be Decontaminated

By JAMES GORMAN

Researchers have confirmed that there are several effective methods for decontaminating the N95 masks worn by health professionals so that they can be used more than once, the National Institutes of Health announced Wednesday.

A substantial body of research already showed that the masks, designed for one-time use, can be reused in a crisis. And the Centers for Disease Control and Prevention in March authorized reuse because of shortages driven by the Covid-19 pandemic. In recent weeks the Food and Drug Administration has issued emergency approvals for several systems of mask decontamination.

None of these rules or methods are intended for the cloth masks recommended or in some locations required for use by everyone in public. The C.D.C. advises regular washing of homemade fabric masks in a washing machine.

Earlier research had not, of course, involved the new coronavirus. The new research, done at the Rocky Mountain Laboratories of the National Institute of Allergy and Infectious Diseases and used live novel coronavirus, formally known as SARS-CoV-2, to test the mask material. The study determined which decontamination procedures were most effective, and how they affected the integrity of the masks.

Vincent Munster, one of the authors of the new work, who collaborated with other government researchers and scientists at the University of California, Los Angeles, said the work built on more than a decade of studies of decontamination. "We showed that it actually works as well for SARS-CoV-2 as for influenza," and for bacteria, he said.

The research was posted on MedRxiv, a website where scientists have been posting articles submitted for publication elsewhere that have not yet been through peer review. But N.I.H. publicized the study because it could be helpful to health care professionals in the midst of a crisis, and it was validating and extending previous work, not suggesting untried methods.

Dr. Munster and his colleagues tested four methods of killing the virus: UV light, dry heat, vaporized hydrogen peroxide (VHP) and ethyl alcohol. Of those methods, they did not recommend ethyl alcohol because although it killed the virus, it degraded the mask material.

The researchers first tested samples of N95 material to which live virus had been applied. That work was done in a biosecure lab. After treatment, they cultured virus particles from the material to see if the shielding remained effective in limiting transmission.

Then they tested the same methods on whole masks without the virus to determine whether their structure and functioning were damaged after rounds of decontamination.

Dr. Munster said that even if decontamination worked perfectly, but the mask no longer fit "then obviously your mask is not really good for reuse anymore."

Vaporized hydrogen peroxide, a method often available in large hospitals, was effective, and left the masks still functioning for at least three rounds of decontamination, as did UV light.

Dry heat, at 70 degrees Celsius or 158 degrees Fahrenheit, was effective, but the masks withstood only two rounds of decontamination. Dr. Munster said that "vaporized hydrogen peroxide would be the method of choice if that's available." However, he said, a nursing home might not have that, while for dry heat, what's needed is basically an oven.

Dr. Lynn Goldman, dean of George Washington University's Milken Institute School of Public Health, said in an email that she thought the new research was an "excellent contribution." She said it was "helpful to see that either VHP or UV can effectively sterilize N95 masks and make them available for reuse up to three times."

Several methods were effective at killing the new coronavirus.

Another recent study from Canadian researchers, also not yet peer reviewed, confirmed the value of decontamination. It included masks of different brands and found that the material of the mask was still effective after 10 rounds of vaporized hydrogen peroxide decontamination.

One of the authors of that paper, Dr. Anand Kumar at the University of Manitoba, said that his procedure was slightly different from Dr. Munster's in that it did not test the structure and facial fit of the mask, only the filtering ability of the material.

The recommendations and findings in the two papers are intended to be useful for institutions that have health care workers wearing N95 masks. With personal protective equipment in short supply at many hospitals, some front-line workers, including doctors and nurses, have complained that masks were rationed.

The public has been advised not to use or try to buy N95 masks because they would be depriving health care workers of lifesaving equipment.

"And if they do, they shouldn't try decontaminating them," Dr. Kumar said.